



# The use of Plastic and Recycling Strategies adopted by Retail Establishments: The Case of Bahrain

Arpita Dutta

College of Administrative and Financial Sciences  
AMA International University, Kingdom of Bahrain

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**Abstract:** The increased usage of non-biodegradable packaging materials as well as ineffective recycling strategies results in greenhouse gas emissions, more harmful than carbon dioxide. This study identified consumer behavior and perception related to the increased use of plastic bags in transporting household goods from shops. Specifically, the study identified the status and effectiveness of the use of Non-Biodegradable packaging methods amongst retailing establishments in Budaiya and Saar area, in the Kingdom of Bahrain in terms of Use, Frequency, Recycling Strategies adopted, and the problems encountered in recycling and re-use packaging materials. Descriptive Study Method of Research was used in this study. Likewise the researcher also used the 5 point Likert's Scale in the Study. The respondents strongly agreed that there is high usage of plastic bags in the Kingdom of Bahrain. The reason given was, durability, cheaper price, lighter than other alternatives and easy storage. The rating of agree was given in terms of high frequency of single use thin plastic bags given to the customers than other packing methods, because of the shopping trips made frequently. The respondents moderately agreed that recycling strategies adopted by both the retail establishments and the consumers are in place in the Kingdom of Bahrain but indiscriminate use and disposal of these plastic carrier bags do pose a significant environmental threat to the country. Plastic carrier bags were found to be favored in transporting high-risk food products to avoid possible cross contamination. The most common challenge noted was lack of strict regulations concerning use of reusable bags, lack of awareness level among the citizens, and innovative recycling strategies. Consumers' perceptions and usage behaviors in connection with respective government's policies and implementation of recycling systems could be highly decisive in reducing the eco-impact of plastic and paper shopping bags.

**Keywords:** Usage, Plastic Bags, Reduce; Reuse; Recycle; Disposal to Landfil.

## Introduction

To cater to the different shopping needs of the people, there are many types of shopping bags available in the market. A variety of raw materials and technologies are employed to produce them. The most popular ones are plastic and paper bags. Plastic bags are made from non-renewable resources, where the main ingredients used are petroleum and natural gas. Polyethylene - High Density, Low Density, Linear low-density polyethylene (LLDPE) are the raw materials generally used for the manufacture of plastic bags [Lajeunesse, 2004]. The shopping bags used by supermarkets are ideally produced out of LLDPE to get the desired thickness and glossy look. And if one needs very thin and gauzy bags then LDPE which are light

weight for transporting household goods from street shops, would be an ideal choice [Ellis et al. 2005]. Plastic bags seem to be slender and light and hence are easy to carry. As per Arlington, Virginia, based American Plastics Council, plastic bags are cheap to produce and that they have occupied as high as 80 percent of the grocery and convenience store markets [Roach, 2005]. Both plastic and paper bags are used by most people for shopping needs, although frequency and percentage of use differs between the individuals. This phenomenon appears to contradict contemporary public policy to ensure sustainable development [Ritch and Brennanand 2009]. At first glance, the figures do seem startling with the total number of free carrier bags distributed by retailers reaching 8 billion annually [Wrap, 2005]. The average



household is estimated to be use around 400 carrier bags each year [Hay, 2010]. The perceived impact of these bags include the consumption of non-renewable resources to manufacture a single-use product, low recovery rates at end of life, and high visibility and ecological impacts in litter [Lewis et al. 2010]. In addition, plastic carrier bag concerns have been raised as they are now seen as a symbol of a modern ecological crisis due to concerns over waste management [Hawkins, 2001].

Bahrain is one of the largest consumers of goods and services in the world and hence the country can be considered as a contributor of environmental degradation. If businesses in the country are willing to switch to sustainable packaging by using reusable cloth or plastic bags, their overall footprint will reduce, greatly lowering the environmental impact.

Retail establishments have taken voluntary measures to reduce the numbers of plastic carrier bags handed out at supermarkets, such as placing plastic carrier bags under the till out of the customers' sight, forcing customers to ask for them rather than have free access [Wrap, 2009; 2010]. However, effectiveness of this measure has become questionable. Furthermore, it has been suggested that plastic bag has become symbolic of a throwaway society and is readily held up to emphasize the message of sustainability and the link between behavior and impact on the environment, possibly without justification [Williams, 2004]. The environmental problems associated with plastic bag use include littering and associated indiscriminate waste (bags escaping from landfill) [Smith, 2004]. Disposal is closely linked to consumer behavior, highlighting resource consumption issues that include reduction, reuse and recycling as combative measures. Plastic degradability issues relating to littering and resource use are also of significance, particularly concerning littering of the marine environment. However, those in support of plastic carrier bags argue that plastic bag litter accounts for just 0.03% of all litter in the UK. As plastic bags find their way into the landfill, other concerns are raised as they take between 400-1000 years to breakdown and may require light energy to do so. In addition, leaching of toxic chemicals resulting from the breakdown of these materials have the potential to disrupt hormone levels in animals within the food chain, and may be passed to humans [Aldred, 2007; Wrap, 2010] in various ways.

### Research Design

The qualitative and quantitative analysis method fulfilled this research. The study is descriptive in nature and made use of Random Sampling. A five point Likert survey questionnaire was used to obtain the data supported

by focused group discussion. The type of the questions included in the research required finite responses, and clearly delineated, which enabled the respondents to easily recall and make fast decisions regarding the popularity and frequency of the use of non-biodegradable packaging methods amongst retail establishments in Budaiya, Kingdom of Bahrain, problems encountered in the use of biodegradable packaging methods.

The respondents of the study were the managers, supervisors, and customers of Supermarkets and cold stores located in Budaiya and SAAR area, Kingdom of Bahrain. Only the use of 3 types of bags have been included in the study, oxo-biodegradable bags, biodegradable bags and thin colored plastic bags.

### Results and Discussions

Most respondents strongly agreed and with average mean response of 4.59 that there is high usage of plastic bags in the Kingdom of Bahrain. These carrier bags are generally provided free of charge, a prime reason for the shoppers to use these bags excessively. The same adjectival rating of strongly agreed is also given by the respondents on durability, cheaper price, lighter than other alternatives and easy storage and hygienic. Respondents said they use the single use thin plastic bags whenever they forget to bring along their reusable. Another reason for the high number of plastic bag in use was noted, as many respondents reported that they are not interested in acquiring any of the available alternatives like reusable bag for life, woven reusable bags, cotton reusable bags, because these are costlier options. In addition, the type of shopping trip is also another factor that determines the bag type they will likely use.

On lack of alternative packaging methods in retail establishments, the cold stores strongly agreed. The reason might be that the shop owners in absence of any type of penalties imposed by the government resorted to the use of the cheapest bags and also most cold store customers were unaware of the legal and social cost dimensions to plastic bag use in the absence of adequate and accurate information. However the study found that the managers, supervisors, and high proportion of consumers who visited the supermarkets are aware about the environmental impact of thin plastic bags and preferred buying alternative bags for grocery shopping. The respondents had mixed feelings regarding continuation of the use of plastic bags without any kind of governmental interventions. The cold stores strongly agreed that usage of plastic bags should continue.

The average adjectival rating of agree (3.73) is given by the respondents in terms of high frequency of single use thin plastic bags given to the customers. The relatively



good perceptions of the respondents like strongly agreed are as such because of the shopping trips made frequently to the retail establishments. The respondents rarely used single use thin plastic bag for repeated shopping trips as they are given free of charge in every visit. This happens because in a situation of no actual penalties, the shop owners of cold stores resorted to the use of the cheapest bags. Secondly the study also found that, most consumers of cold stores were unaware of the legal and social cost dimensions to plastic bag use in the absence of adequate and accurate information on the subject.

However in case of supermarkets, there is sale and reuse of alternative bags like canvas or woven bags, though not often. The reason might be that there is regular promotion about the use of reusable bags by displaying alternative bags and suggesting them to the consumers during checkout. This type of interventions is putting some amount of pressure on the consumers to buy them and bring the same bags for every shopping trip. It is clear from the study that this class of consumers is more environmentally friendly. Most respondents have strongly agreed and with average mean response of 4.59 means there is high usage of plastic bags in the Kingdom of Bahrain. These carrier bags are generally provided free of charge, a prime reason for the shoppers to use these bags excessively. The same adjectival rating of strongly agreed is also given by the respondents on durability, cheaper price, lighter than other alternatives and easy storage and hygienic. Respondents said they use the single use thin plastic bags whenever they forget to bring along their reusable. Another reason for the high number of plastic bag in use was noted, as many respondents reported that they are not interested in acquiring any of the available alternatives like reusable bag for life, woven reusable bags, cotton reusable bags, because these are costlier options. As also found in this study.

[Hopewell, Dvorak and Kosior, 2009] found that the reuse rate of plastic bags indicated that consumers rarely use plastic carrier bag for repeated shopping trips in line with similar studies [Wrap, 2006], the frequency of conventional carrier bags reuse could be encouraged with the right strategy. In addition, the type of shopping trip is also another factor that determines the bag type they will likely use. When making purchases such as raw meat and other high risk food products, the customers tend to avoid possible cross contamination and plastic carrier bags are used.

On lack of alternative packaging methods in retail establishments, the cold stores strongly agreed. The reason might be that the shop owners in absence of any type of penalties imposed by the government resorted to the use of the cheapest bags and also most cold store customers were unaware of the legal and social cost dimensions to plastic bag use in the absence of adequate and accurate information. However the study found that the managers, supervisors, and high proportion of consumers who visited the supermarkets are aware about the environmental impact of thin plastic bags and preferred buying alternative bags for grocery shopping. A study found that the most common reason provided for the use of plastic carrier bags was the respondent forgetting to take their reusable bags during subsequent shopping trips [Wrap, 2005]. In addition, providing the plastic carrier bags free of charge may be an additional factor that hinders the campaign on alternative bags use gaining wider acceptance. The respondents had mixed feelings regarding continuation of the use of plastic bags without any kind of governmental interventions. The cold stores strongly agreed that usage of plastic bags should continue.



**Table 1: Status of the use of Non-Biodegradable packaging methods amongst retailing establishments in Budaiya, in the Kingdom of Bahrain in terms of :Usage**

| Indicators                                       | Supermarket | Cold Store | Consumers | Average | Interpretation   |
|--|-------------|------------|-----------|---------|------------------|
| Plastic bags are easily available                | 5.00        | 5.00       | 4.84      | 4.95    | Strongly Agree   |
| Plastic bags can be used for other purposes also | 4.57        | 4.83       | 4.78      | 4.73    | Strongly Agree   |
| Plastic bags can be disposed off easily          | 4.71        | 5.00       | 4.78      | 4.83    | Strongly Agree   |
| Plastic bags are durable and hygenic over others | 4.43        | 5.00       | 4.81      | 4.75    | Strongly Agree   |
| Plastic bags are cheaper than others             | 4.71        | 5.00       | 4.89      | 4.87    | Strongly Agree   |
| Plastic bags are lighter than others             | 4.86        | 5.00       | 4.81      | 4.89    | Strongly Agree   |
| Plastic bags can be stored easily                | 4.86        | 5.00       | 4.86      | 4.91    | Strongly Agree   |
| There is lack of alternative packaging materials | 1.86        | 5.00       | 3.30      | 3.38    | Moderately Agree |
| Usage of plastic bag is increasing               | 4.71        | 5.00       | 4.95      | 4.89    | Strongly Agree   |
| Usage of plastic bags should continue.           | 2.71        | 5.00       | 3.32      | 3.68    | Agree            |
| Average  | 4.24        | 4.98       | 4.54      | 4.59    | Strongly Agree   |

**Table 2: Status of the use of Non-Biodegradable packaging methods amongst retailing establishments in Budaiya, in the Kingdom of Bahrain in terms of: Frequency**

| Indicators                                 | Supermarket | Cold Store | Average | Interpretation |
|--|-------------|------------|---------|----------------|
| Plastic bags are used often.               | 4.86        | 5.00       | 4.93    | Strongly Agree |
| 5-6 plastic bags given per grocery visit   | 4.86        | 3.00       | 3.93    | Agree          |
| 2-3 visits in a week                       | 4.71        | 3.17       | 3.94    | Agree          |
| 8-12 visits in a month                     | 4.71        | 4.50       | 4.61    | Strongly Agree |
| 50-1000 plastic bags are consumed in a day | 4.71        | 4.33       | 4.52    | Strongly Agree |
| 350-1700 plastic bags in a week            | 4.86        | 4.17       | 4.51    | Strongly Agree |
| 1400-3000 plastic bags in a month          | 4.71        | 3.83       | 4.27    | Agree          |



**Table 3: Status of the use of Non-Biodegradable packaging methods amongst retailing establishments in Budaiya, in the Kingdom of Bahrain in terms of: Recycling Strategies**

| Indicators  | Supermarket | Cold Store | Customers | Average | Interpretation   |
|---|-------------|------------|-----------|---------|------------------|
| There is a strong awareness about the amount of litter and trash plastic bags create.                     | 4.71        | 4.67       | 3.81      | 4.40    | Agree            |
| Effective Recycling Strategies are followed everyday  | 4.71        | 1.33       | 2.24      | 2.76    | Moderately Agree |
| Plastics bags are disposed properly in recycling Bins that have been set up in the neighborhood.          | 4.71        | 1.33       | 3.46      | 3.17    | Moderately Agree |
| Reuse of plastic bags are always done for other purposes, like picking up pet waste or lining trash cans. | 4.57        | 4.50       | 3.46      | 4.18    | Agree            |
| Bahrain has a recycling plant which can turn plastic bags into desirable products                         | 1.43        | 1.00       | 3.41      | 1.94    | Disagree         |
| Strict Legislation is not in place on recycling process in Bahrain  | 4.71        | 4.17       | 4.05      | 4.31    | Agree            |
| Open dumping plastic disposal strategy is leading to environmental problems                               | 3.29        | 4.83       | 4.46      | 4.19    | Agree            |
| Retail establishments are promoting the reuse, recycling and recovery of plastics .                       | 4.57        | 1.50       | 2.51      | 2.86    | Moderately Agree |
| Retail establishments are working continuously on improvement and the quantity and quality of recycling.  | 4.86        | 1.00       | 2.38      | 2.75    | Moderately Agree |
| There is a system of frequent promotion of recycling options by the government of Bahrain.                | 1.71        | 1.50       | 1.68      | 1.63    | Disagree         |
| Average   | 3.93        | 2.58       | 3.15      | 3.22    | Moderately Agree |

The average adjectival rating of agree(3.73) is given by the respondents in terms of high frequency of single use thin plastic bags given to the customers. The relatively good perceptions of the respondents like strongly agreed are as such because of the shopping trips made frequently to the retail establishments. The respondents rarely used single use thin plastic bag for repeated shopping trips as they are given free of charge in every visit. This happens because in a situation of no actual penalties, the shop owners of cold stores resorted to the use of the cheapest bags. Secondly the study also

found that, most consumers of cold stores were unaware of the legal and social cost dimensions to plastic bag use in the absence of adequate and accurate information on the subject.

However in case of supermarkets, there is sale and reuse of alternative bags like canvas or woven bags, though not often. The reason might be that there is regular promotion about the use of reusable bags by displaying alternative bags and suggesting them to the consumers during checkout. This type of interventions is



putting some amount of pressure on the consumers to buy them. and bring the same bags for every shopping trip. It is clear from the study that this class of consumers is more environmentally friendly.

On the average, the respondents moderately agreed with a mean of 3.22 that recycling strategies adopted by both the retail establishments and the consumers are in place in the Kingdom of Bahrain. The average adjectival rating of agree (4.19) is given by the respondents that the discriminate use and disposal of these plastic carrier bags do pose a significant environmental threat to the country. In absence of any enforcement of legislation by the government, environmental degradation is happening at a rapid pace. A majority of consumers claim to reuse carrier bags for a number of different purposes picking up pet waste or lining trash cans but rarely used for repeated shopping trips. However, most of the respondents agreed that they are unaware of any form of plastic carrier bag recycling at the store. This finding supports the earlier claim that the vast majority of plastic carrier bags end up being disposed of with general

domestic waste and ultimately find their way into landfill sites [Aldred, 2007]. This finding did add to the issue with regard to the indiscriminate waste problems associated with the escape of plastic carrier bags as litter. In addition, the disposal of plastic carrier bags to landfill sites poses a significant environmental burden when including issues relate to production and resource use [Wrap, 2010]. On Retail establishments are working continuously on improvement and the quantity and quality of recycling by promoting the re-use, recycling and recovery of plastics, the consumers of both cold and supermarkets gave adjectival rating of moderately agree (2.86). This implies that the cold stores and supermarkets are not promoting any kind of recycling programs, though there are drop off points for unwanted plastic bags. All the respondents disagreed that Bahrain has a recycling plant which can turn plastic bags into desirable products and the government of Bahrain is regularly promoting the use of recycling programs all over the country.

**Table 4: Level of effectiveness of the use of Non-Biodegradable packaging methods amongst retailin establishments in Budaiya, Kingdom of Bahrain in terms of Environmental Sustainability**

| Indicators   | Supermarket | Cold Store | Consumers | Average | Interpretation |
|--|-------------|------------|-----------|---------|----------------|
| Retail Establishments are trying to look beyond making short term gains and looking at the long term impact they are having on the natural world with particular emphasis on preserving the capability of the environment to support human life. | 4.57        | 2.67       | 4.05      | 3.76    | Effective      |
| Responsible decisions of the retail establishment reduces the business' negative impact on the environment and thereby promotes environmental sustainability.  | 4.86        | 1.50       | 3.96      | 3.44    | Neither        |
| Actions are being taken to help ensure a better world for generations to come by trying to create zero waste.  | 4.71        | 1.67       | 3.94      | 3.44    | Neither        |
| There is a policy on exchange and reuse of plastic bags thereby increasing the life span of the products so that they don't wind up in trash bags.   | 3.43        | 1.33       | 3.14      | 2.63    | Neither        |
| Retail establishments have been able to reduce both operating costs and the environmental impact of its business practices.  | 5.00        | 2.83       | 4.00      | 3.94    | Effective      |
| <b>Average</b>   | 4.51        | 2.00       | 3.82      | 3.44    | Neither        |



On the average, the respondents rated neither with a mean of 3.44 that process of creating environmental sustainability by retail establishments are neither effective nor ineffective. With an adjectival rating of Effective, the respondents (managers, supervisors of Supermarkets and consumers) perceived that only retail establishments like Super Markets have been able to work on preserving the capability of the environment to support human life by using biodegradable bags and cotton bags, and promoting the sale of alternative bags.

All decisions taken by these big stores are stressing on how to reduce negative impact on the environment and thereby promoting environmental sustainability. Actions are being taken by these big stores to help ensure a better world for generations to come by trying to create zero waste having re-cycling collection points for different types of wastes.

The study found that the supermarkets are encouraging the customers to reuse the biodegradable plastic bags, thereby increasing the life span of the products so that they don't wind up in trash bags. However the respondents rated neither or ineffective the efforts made by Cold stores in creating environmental sustainability. The cold stores are providing the plastic bags free of charge and that may be the reason that is making consumers go for this kind of bag instead of buying and using alternative bags which are costlier. The cold stores are not bothered about having any form of plastic carrier bag recycling at the store, or using or promoting any recycling programs as there is no penalty for selling them. Moreover majority of the consumers who visit cold stores regularly don't have enough knowledge related to environmental benefits in order to prompt use of alternative bags. As noted, [Njeru, 2006], urban environmental problems are likely results from the intricately intertwined economic, political and cultural process. Upon closer analysis, the ecological process involved can lead to the transformation of the urban environment while the economic, political and cultural processes has the tendency to create, recreate and maint

### Conclusions and Recommendations

The respondents strongly agreed that there is high usage of non-biodegradable packaging methods in the Kingdom of Bahrain but the frequency of reusing a bag, is not that high. Regarding recycling strategies adopted by the two kinds of retail establishments the respondents perceived that super markets are doing much better. In terms of the level of effectiveness, the respondents perceived that recycling strategies adopted as well as process to bring about environmental sustainability by the retail establishments are neither effective nor ineffective in reducing plastic and creating sustainability

in the country. In terms of Customer satisfaction, the study found that the consumers who make regular visits to super markets perceived with a mean of 3.86 that actions are being taken to help ensure a better world for generations to come by trying to create zero waste. The study found that the major problems the retail establishments are facing is in terms of implementing recycling strategies and creating environmental sustainability ; misuse and improper disposal of plastic bags, inadequate level of Governmental support to promote reusable packaging methods, cost factor in the implementation of reusable packaging methods. Although there seems to be a small number of stores and consumers participating in the recycling programs, the researchers suggest adopting policies and programs to increase the awareness of the benefits and programs available for plastic carrier bag recycling. Instituting policies and programs to increase recycling efforts should be tailored to the participants and stake-holders for best success rates. The findings presented here suggest more may need to be done to increase environmental awareness and stress the importance of plastic bag recycling.

### References

- Carrier Bag Consortium 2011, Fast facts about plastic bags a quick-reference resource based on science not spin. Available at:  
[http://www.carrierbagtax.com/downloads/CBC\\_Web\\_Pages.pdf](http://www.carrierbagtax.com/downloads/CBC_Web_Pages.pdf)
- Decker, R. & Graff, A. Paper Vs. Plastic Bags 2012? Can be viewed at <http://www.angelfire.com/wi/Pap>
- Ritch, E, Brennanand C, Macleod, C . 2009, Plastic Bag Politics: Modifying Consumer Behaviour for Sustainable Development. International Journal of Consumer Studies, 33, 168-174
- Ellis, S., 2005, Plastic Grocery Bags: The Ecological Footprint, Student publications, VIPIRG publications, University of Victoria, pp. 1-19
- Hawkins, G. 2001, Plastic Bags , Living With Rubbish. International Journal of Cultural Studies, Vol. 4, No. 1, pp. 5-23
- Lewis, H, Verghese, K, and Fitzpatrick, L. 2010, Evaluating the sustainability impacts of packaging: the plastic carry bag dilemma. Packaging Technology and Science, No.23, pp.145-160
- Aldred, J Q, 2007, Plastic Bags. Guardian Unlimited, Available at:



- <http://www.guardian.co.uk/environment/2007/nov/13/plasticbags.pollution?gusrc=rss&feed=society>
- Hopewell, J, Dvorak, R and Kosior, E, 2009, *Plastics Recycling: Challenges and Opportunities*. Philosophical Transactions of the Royal Society of Biological Sciences, No.364, pp. 2115-2126.
- Hay, L. 2010, In Practice. Perspectives In Public Health, Vol.130, No. 4, pp.153- 164.
- Lajeunesse, S. 2004., *Plastic Bags, Chemical and Engineering News*, Vol. 82, No. 38, pp.51 -69.
- Njeru 2006, *The urban political ecology of plastic bag waste problem in Nairobi, Kenya*,
- Reusablebags.com. Paper Bags Are Better Than Plastic, Right? Reusablebags.com, can be viewed at: <http://www.reusablebags.com/facts.php?>
- Roach, J, 2003, *Are Plastic Grocery Bags Sacking the Environment?*, National Geographic News, ,Can be viewed at: [http://news.nationalgeographic.com/news/2003/09/0902\\_030902\\_plasticbags.html](http://news.nationalgeographic.com/news/2003/09/0902_030902_plasticbags.html)
- Smith, S. 2004, *Plastic Bags*. Briefing No 5/04.NSWParliamentary Library Research Service, ISSN 1325-4456. pp1-18,
- Williams, C. 2004, *Battle of the Bag: The World has Declared War on the Plastic Bag*. What did this harmless item do to attract such opprobrium? *New Scientist*, No. 183, pp30.
- Waste Resource Action Programme-WRAP 2006, *The "Choose to Reuse" Trial: Testing an approach to reducing carrier bag waste..* Available at: [http://www.wrap.org.uk/retail\\_supply\\_chain/research\\_tools/research/report\\_choose\\_to.html](http://www.wrap.org.uk/retail_supply_chain/research_tools/research/report_choose_to.html)
- Waste Resource Action Programme-WRAP 2005: *Carrier Bag Usage and Attitudes: Benchmark and Target Market Study*. Available at: <http://home2.btconnect.com/reusabags/pdf>
- Waste and Resource Action Programme-WRAP 2009, *Case Studies: Reducing Carrier Bag Use 2009*.Can be seen at: [http://www.wrap.org.uk/downloads/Carrier\\_Bag\\_Case\\_Studies\\_22\\_Mar\\_111.b245ecdf.7362.pdf](http://www.wrap.org.uk/downloads/Carrier_Bag_Case_Studies_22_Mar_111.b245ecdf.7362.pdf)
- Waste and Resource Action Programme-WRAP 2010: *UK Supermarket Retailers Voluntary Carrier Bag Agreement: Carrier Bag Use*. Can be seen at: [http://www.wrap.org.uk/sites/files/wrap/2010\\_Carrier\\_Bag\\_Use.pdf](http://www.wrap.org.uk/sites/files/wrap/2010_Carrier_Bag_Use.pdf)
- Waste and Resource Action Programme-WRAP 2010: *Environmental Benefits of Recycling: 2010 update*. Available at: <http://www.wrap.org.uk/content/environmental-benefits-recycling>
- <http://www.greenmanpackaging.com/why-use-biodegradeable-/index.php>.

